

What is claimed is:

1 1. In a ball nut having at least one internal bearing race
2 with a first end and a second end, and a crossover passage for
3 connecting the first end and the second end to form a continuous
4 recirculating path for a plurality of ball bearings, the improvement
5 comprising:

6 at least two eyelets, each eyelet having a helix passage for
7 receiving a plurality of ball bearings formed in a flange end and a
8 crossover passage formed in the flange end, the crossover passage in
9 communication with the helix passage for returning the plurality of ball
10 bearings, wherein assembling the two eyelets in flange-to-flange
11 relationship with respect to one another defines at least one raceway
12 having a single recirculating rotational path for receiving the plurality of
13 ball bearings.

1 4. The ball nut of claim 1 further comprising:
2 the eyelet drawn and coined to form the helix passage and
3 crossover passage in the flange end of the eyelet.

1 6. The ball nut of claim 5 further comprising:
2 at least one tab formed on the flange end of the eyelet to
3 define the lock member.

1 7. The ball nut of claim 1 further comprising:
2 the plurality of ball bearings inserted within the helix
3 passage and the crossover passage during assembly.

1 8. ~~The ball nut of claim 1 further comprising:~~
2 a punch in the helix passage to direct ball bearings into the
3 crossover passage.

1 9. The ball nut of claim 1 wherein the eyelet is formed of a
2 metal material selected from a group including steel, hardened steel,
3 melonited steel, heat treated steel, stainless steel, spherodized stainless
4 steel, annealed stainless steel, and heat treated stainless steel.

1 10. The ball nut of claim 1 further comprising:
2 the eyelet hardened to approximately R_c 62. Why?

1 11. In a ball nut having at least one internal bearing race
2 with a first end and a second end, and a crossover passage for
3 connecting the first end and the second end to form a continuous
4 recirculating path for a plurality of ball bearings, the improvement
5 comprising:

6 an elongate, generally cylindrical-shaped, metal injection
7 molded ball nut body with a helix passage for receiving a plurality of ball
8 bearings.

1 12. The ball nut of claim 11 further comprising:

2 the ball nut body having a slot defined through a portion of
3 the circumference extending along an entire longitudinal length of the ball
4 nut body, such that the ball nut body has a generally C-shaped cross-
5 section along the entire longitudinal length; and

6 a side insert formed engageable with the slot in the ball nut
7 body, the side insert having ball-stops and a crossover passage defined
8 therein, and the side insert assembled with respect to the ball nut body
9 to define at least one raceway having a single recirculating rotational
10 path for receiving the plurality of ball bearings.

1 13. The ball nut of claim 12 wherein the side insert is
2 formed of plastic.

1 14. The ball nut of claim 11 further comprising:
2 a plurality of individual raceways having separate
3 recirculating rotational paths disposed parallel with respect to one
4 another for receiving the plurality of ball bearings.

1 15. The ball nut of claim 11 wherein the ball nut body is
2 injection molded of stainless steel.

1 16. The ball nut of claim 11 further comprising:
2 the ball nut body carburized to a hardness of approximately
3 58 R_c.

1 17. The ball nut of claim 11 further comprising:
2 a ball-engaging surface finish of approximately
3 30-40 μ inches.

1 18. In a ball nut having at least one internal bearing race
2 with a first end and a second end, and a crossover passage for

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3 connecting the first end and the second end to form a continuous
4 recirculating path for a plurality of ball bearings, the improvement
5 comprising:

6 a flat metal strip having at least one groove formed therein
7 for receiving a plurality of ball bearings, the strip rolled to a
8 predetermined diameter and lead with the at least one groove facing
9 radially inward; and

10 a carrier for receiving the rolled strip inserted therein, the
11 carrier having a crossover passage formed therein to define at least one
12 raceway having at least one recirculating rotational path for receiving the
13 plurality of ball bearings.

1 19. The ball nut of claim 18 further comprising:
2 the flat metal strip having a coined groove.

1 20. The ball nut of claim 18 further comprising:
2 the flat metal strip having a through rolled groove.

1 21. The ball nut of claim 18 wherein the flat metal strip is
2 formed of 410 martensitic stainless steel.

1 22. The ball nut of claim 18 further comprising:
2 the carrier overmolded after insertion of the rolled strip.

1 23. The ball nut of claim 18 further comprising:
2 the strip having a roll formed groove therein defining a race
3 for receiving the plurality of ball bearings, the strip formed of a constant
4 thickness metal material.

1 24. The ball nut of claim 23 further comprising:

2 the strip hardened after roll forming the groove and rolled to
3 the predetermined diameter and lead.

1 25. The ball nut of claim 18 further comprising:
2 the flat metal strip having a stamped groove and a stamped
3 crossover passage therein for receiving a plurality of ball bearings, the
4 crossover passage in communication with the groove for returning the
5 plurality of ball bearings from one end of the groove to an opposite end.

1 26. The ball nut of claim 25 further comprising:
2 the stamped metal strip hardened after rolling to the
3 predetermined diameter and lead.

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